



**CERTIFICATION OF AN OPTICAL SCAN SYSTEM AND DIRECT RECORDING
ELECTRONIC VOTE TALLYING SYSTEM**

In July 2005 Diebold Election Systems of Allen, TX requested the review and examination of an optical scan and direct recording electronic vote tallying system under RCW 29A.12.020, 29A.12.080 and WAC 434-333-107. The hardware and software for this system is marketed under the name GEMS Accuvote-OS and GEMS Accuvote-TSx.

Upon examination of the Diebold System, the Secretary of State finds the system satisfies the requirements of Washington State law.

On this date, the Office of the Secretary of State hereby certifies the "*GEMS Accuvote-OS and Accuvote-TSx System*", submitted by Diebold, and approves it for use by County Governments of the State of Washington.

This version of the system, qualified under NASED (N-06-22-22-001 and N-06-22-22-002), consists of:

- *Hardware*, comprised of:
 - AccuVote-TSx, equipped with AccuView printer (v.4.6.4)
 - AccuVote-OS, equipped with a visible light read head, (v1.96.6)
 - 2000/4000 ExpressPoll (v1.1.15)
 - AccuVote-OS, equipped with a visible light read head and AccuFeed unit (v2.0.12);
 - Voter Card Encoder, (v.1.3.2)
- *Software*, comprised of:
 - GEMS; software version 1.18.24,
 - Key Card Tool, v.4.6.1
 - VC Programmer, v.4.6.1

Under the provisions of RCW 29A.12.020 and WAC 434-333-107, the Diebold GEMS Accuvote-OS and Accuvote-TSx System is approved for use in Washington State, as an optical scan system and direct recording electronic system, when used in compliance with the procedures contained in this certification, the accompanying Report and Findings, and Washington State law.

Certified on this February 1, 2006




SAM REED
Secretary of State

VOTING SYSTEMS REVIEW PANEL FINDINGS AND RECOMMENDATION

FINDINGS

At the hearing conducted by the Voting Systems Review Panel, some concerns were raised in testimony as to whether this system is compliant with the voting systems standards in the Help America Vote Act of 2002 (HAVA). At issue here is the question of whether the Accuvote-TSx qualifies as a poll site voting device that meets the disability access requirements of HAVA section 301 because it does not provide sip'n'puff or tactile pad interfaces.

Section 301 is clear that a range of disabilities must be accommodated but the only standard defining the range included in the section is "nonvisual accessibility for the blind and visually impaired". The Election Assistance Commission (EAC) Advisory 2005-004 (July 20, 2005) also made it clear that a range of disabilities must be accommodated in referencing the 2002 Voting Systems Standards. However, nowhere in HAVA, the EAC advisory, or the 2002 Voting Systems Standards is there a requirement that manual dexterity disabilities be accommodated with the use of sip'n'puff or tactile pad interfaces.

The VRSP notes the AccuVote-TSx does accommodate people with poor dexterity by providing:

- A stand that sets up at the proper height for wheel chairs
- Buttons and touch screen spaces that are large and spaced appropriately
- A better process of voting than trying to stay with the lines of a bubble on a paper ballot.

The Panel believes the federal standards could have provided better guidelines for accommodating disabilities. However, the Panel finds imposing requirements inconsistent with federal standards undermines our local jurisdictions' ability to obtain the equipment necessary to conduct their mandated responsibilities.

Although there are no current federal or state standards for 'sip n puff' and tactile pad accessibility features, the Panel received testimony from Diebold that they have a prototype in testing with disability focus groups now. The Panel believes this technology broadens the range of accessibility, meets the intent of HAVA, and is likely to be adopted as a standards requirement in the foreseeable future. The Panel expects Diebold to develop this technology with deliberate haste and notes that some of Diebold's competitors have already implemented these features as part of their system.

Other concerns were raised about the interlocking issues related to the Accuvote system security and possible future actions that may be taken by NASED regarding the Diebold certification. These issues are also referenced in the staff report.

The Panel finds the testimony of Diebold and Secretary of State staff compelling. The system can be used safely and securely using standard procedures as outlined in the staff report. The memory card device is a "ballot box" and must be treated with the same sort of protections that voted and unvoted ballots receive.

The Panel further notes that the component being challenged is not new but has been part of the Diebold system since it was introduced in the state when it was owned by Global Election

Management Systems. The state experience with the system including numerous hand recounts and 'Logic and Accuracy' tests provides additional evidence that the system has not been compromised in its use.

The Panel also accepts the testimony of Diebold that the encryption technology employed with the new Accuvote-TSx would make it difficult, if not impossible, to successfully alter the database on the TSx memory card. This technology along with the Key Card security procedures and voter verifiable paper audit trail add multiple layers of security while maintaining the layer of security provided by standard procedures used with the OS system.

The Panel also understands the new Accuvote-TSx will be provided as an optional method of voting at the polling place and anyone who wants to use a paper ballot will be allowed to do so.

Finally, the Panel cannot anticipate future actions of the NASED board in regards to the Diebold certification. The Panel relies on the testimony of staff and Diebold that the GEMS system can be used safely and securely when using proper procedures and that it has met the state and federal requirements for certification.

RECOMMENDATIONS

By consensus, the Voting Systems Review Panel adopts the recommendation of Secretary of State staff that the Diebold GEMS Accuvote-OS, GEMS Accuvote-OS central count system and Accuvote-TSx with the Accuvue printer module, federally tested and qualified by NASED under #N-06-22-22-001 and #N-06-22-22-002 (2002), be certified for use in Washington state.

The Panel also recommends the procedures outlined in the staff report. The Panel wants to underline the importance of maintaining the procedural and physical security of voting systems. In this case, the Panel believes the procedures recommended by staff are appropriate to maintaining the security of the GEMS system.

In addition to the recommendations in the staff report, the Voting Systems Review Panel adds the following procedures and restrictions to the use of this system:

The user county must provide disposable ear muffs to voters using the audio headphone feature of the Accuvote-TSx. This is also required by the FEC 2002 Voting Systems Standards.

The Accuvote-TSx will be provided as an optional method of voting at the polling place and anyone who wants to use a paper ballot will be allowed to do so

STAFF REPORT OF THE SECRETARY OF STATE ON THE EXAMINATION AND EVALUATION OF AN ELECTRONIC VOTE TALLYING SYSTEM

In June 2005 Diebold of Allen, Texas requested the review and examination of its electronic vote tallying system under RCW 29A.12.020 and 29A.12.030. The hardware and software for this system are marketed under the name Diebold GEMS and NASED certified under N-1-06-22-22-001 and N-1-06-22-22-002. The Software that administrates the election definition and election results components of the system is Diebold GEMS 1.18.24, an upgrade of the previously certified version 1.18.23. The hardware components include the AccuVote-OS optical scan precinct counter, Firmware Release 1.96.6 (previously 1.96.5) and the central count firmware 2.0.12.

Components of the system new to this state are the AccuVote-TSx DRE touch screen with AccuView Printer Module firmware 4.6.4 and a variety of tools to support it; including, Key Card Tool version 4.6.1, VCProgrammer software 4.6.1, Voter Card Encoder 1.3.2, 2000/4000 ExpressPoll with Card Writer function 1.1.5, and Election Media Processor 4.6.2.

AccuVote-TSx DRE with AccuView Printer (firmware 4.6.4)

The TSx is a poll-site based, direct recording electronic (DRE) voting device with a touch screen interface which allows the voters select their choices. The TSx also provides a voter verified paper audit trail (VVPAT), and an audio ballot with headphones for voters with visual disabilities. The TSx comes with a stand that allows wheel chair access to the device.

Diebold provides a variety of tools to encode a smart card which is used to identify the correct ballot to be displayed for each voter when inserted into the TSx. The VCProgrammer software can be installed on a laptop or handheld device equipped with a smart card reader. The ExpressPoll units can be used to issue voter cards. The Voter Card Encoder is a handheld device designed to be used in the polling place to issue voter cards. Finally, the TSx itself can be configured to issue voter cards. It can not however be configured to issue voter cards and be used to vote simultaneously.

The Key Card Tool is a software tool used to create key cards on a smart card reader which are used to copy unique security keys for each election to the TSx, the Voter Card Encoder, the VCProgrammer system, and the Election Media Processor. In addition, it can be used to control the level of election worker access to the devices by issuing security cards that limit access to the administrative functions.

The AccuVote-TSx uses memory cards to control the ballot definition/layout and

store voted ballot images. The Election Media Processor is a smart card reader with multiple ports that can be used to bulk create smart cards and upload election results from smart cards to GEMS. Alternately, the smart cards can be created and uploaded by locally connecting one or more TSx device directly with the GEMS server. The TSx results can also be uploaded from the polling place or depot telephonically. The system uses SSL/TSL protocols to protect the transmission from being intercepted or rerouted.

AccuVote-OS (Firmware 1.96.6)

The AccuVote-OS is a poll-site based, hand fed, optical scan ballot card reader. The reader interprets marked ballots and records vote totals onto a credit card sized memory card. The AccuVote-OS unit can produce individual precinct reports on-site. The memory card contains a rechargeable battery that allows storage of vote totals without being plugged into the AccuVote. Any AccuVote-OS machine can be used to read any memory card and produce reports. An AccuVote-OS machine, attached via serial cable to the central server running GEMS is used to download and program the memory cards.

The AccuVote-OS is equipped with a reader head which uses either infrared light or visible light to scan the ballot. AccuVote-OS equipped with the infrared reader head are capable of reading only marks containing graphite such as those made by a #2 pencil. Visible light AccuVote-OS can read marks made by a wide spectrum of marking devices with the exception of a range of red ink.

Each AccuVote-OS being used as precinct counter at the polling place can be outfitted with an internal PCMCIA modem or connected via serial port to an external modem. The machine can be programmed to automatically call the GEMS server and report precinct ballots. However, the AccuVote-OS must first be closed for voting and then removed from the ballot box, used to house the device while voting is occurring, in order to connect it to a telephone line.

The AccuVote-OS central count system is a collection of AccuVote-OS optical scan ballot card readers equipped with Accufeed devices and connected by network to a central server. Ballots are processed in batches. Each batch is identified by a batch header card which precedes the ballots through the reader. Each reader sends an "image" of the ballot to the server which interprets the marked ballots, and records vote totals in the batch. After all of the ballots in a batch are read, an "ender" card is put through the reader which marks the end of the batch, and queues the batch for posting to the database. Each AccuVote-OS unit produces a log of each batch it processed. Any AccuVote-OS machine can be used to read any batch of ballots.

GEMS Software (version 1.18.24)

The central server runs the Global Elections Management System (GEMS) and receives the ballot images sent from the AccuVote-OS central count readers, interprets them and creates the queue for posting batch totals to the database.

The server also functions as the central accumulator for polling place results. Results from the polling places can be uploaded to the server from AccuVote-OS readers directly connected or through a telephonic connection.

The GEMS software is menu driven and allows the user to describe all aspects of an election. In preparation for ballot counting, the user enters office descriptions, positions, precinct combinations, ballot types, and any statistical information such as registered voter totals. GEMS is used produce and download the precinct specific programming. GEMS also posts the central count batch totals to the database, posts the precinct totals from the polling places to the database, and reports the election results in a variety of formats including; cumulative results, precinct detail, and abstract reports.

An electronic vote tallying system must meet the following requirements (as set forth in WAC 434-335-040) in order to be approved for use in Washington State:

1. Secures to the voter secrecy in the act of voting;
2. Permits the voter to vote for any person for any office and upon any measure that he or she has the right to vote for;
3. Permits the voter to vote for all the candidates of one party or in part for the candidates of one or more other parties;
4. Correctly registers all votes cast for any and all persons and for or against any and all measures;
5. Except for functions or capabilities unique to this state, has been tested and approved by the appropriate independent testing authority approved by the United States election assistance commission.
6. Correctly counts votes on ballots on which the proper number of votes have been marked for any office or issue;
7. Ignores votes marked for any office or issue where more than the allowable number of votes have been marked, but correctly counts the properly voted portions of the ballot;
8. Accumulates a count of the specific number of ballots tallied for each precinct, total votes by candidate for each office, and total votes for and against each ballot measure on the ballot in that precinct; and
9. Produces precinct and cumulative totals in printed form.
10. Be capable of being secured with lock and seal when not in use;
11. Be secured physically and electronically against unauthorized access;
12. Not be connected to, or operated on, any electronic network including, but not limited to, internal office networks, the internet, or the world wide web. A network may be used as an internal, integral part of the vote tabulating system but that network must not be connected to any other network, the internet, or the world wide web; and
13. Not use wireless communications in any way.
14. A remote tabulating system must be able to create a disk, paper tape, or other physical record of ballot results prior to a telephonic transmission of results.

Testing and evaluation of Diebold GEMS with the AccuVote-TSx DRE and Accuvote-OS precinct optical scan counter was conducted by Secretary of State staff, July 14, 2005 at the Secretary of State, 520 E. Union, Olympia. Examining the system for the Office of the Secretary of State was Paul Miller, Elections Information Manager. Also participating in the examination were representatives from Diebold and representatives from VotersUnite. The vendor made a presentation of the Diebold GEMS System and test elections were conducted using groups of test decks prepared at the direction of the Office of the Secretary of State and other ballots prepared by the examiners.

Testing and evaluation Diebold GEMS with the AccuVote-TSx DRE and VVPAT was conducted by the California Secretary of State staff, September 2005 in San Diego. Representing the Washington Secretary of State was Paul Miller, Elections Information Manager. Also participating in the examination were representatives from Diebold and California Secretary of State staff. The vendor made a presentation of the Diebold GEMS System and test elections were successfully conducted on a hundred devices with over one hundred ballots cast on each device using test scripts prepared at the direction of the California Office of the Secretary of State.

Additional testing and evaluation of Diebold GEMS with the AccuVote-TSx DRE and Accuvote-OS precinct optical scan counter was conducted by Secretary of State staff, December 9, 2005 in the King County office at 400 4th Ave, Seattle. Examining the system for the Office of the Secretary of State was Paul Miller, Elections Information Manager. Also participating in the examination were representatives from Diebold and King County staff. The vendor made a presentation of the Diebold GEMS System and test elections were conducted using groups of test decks prepared at the direction of the Office of the Secretary of State.

The modem used in the national ITA testing is a newer model than the modems in King County's AccuVote-OS units. The testing at King County conducted December 9th included the new firmware installed in six King County AccuVote-OS units with the older modems. After running ballots through the AccuVote-OS units, the results were modemed to the central computer and verified.

FINDINGS OF THE SECRETARY OF STATE

The Diebold GEMS optical scan system has been successfully used in King, Chelan, Klickitat, and San Juan County for over eight years, as well as widely throughout the nation. In order for Diebold counties to comply with the HAVA disability access requirements, Diebold counties will need to acquire enough TSx units to be able to provide one in every polling place. The Diebold counties will be providing the TSx as option to their existing optical scan system. In order to add the TSx, the counties must also upgrade their system to the most recent version of GEMS and Accuvote-OS firmware.

A number of issues relating to Diebold arise largely out of national issues that are unrelated to how the systems have functioned in this state.

- The testing here of Diebold's new systems leading to our upcoming certification hearing was generally successful and without incident.
- Diebold's optical scan systems have been used in this state since 1997 without significant or meaningful known problems.

Three incidents from this past year specifically are relevant to Diebold's certification hearing.

- Black Box's well-published 'hack' by Mr. Hursti on behalf of Black Box Voting of a Diebold system in Leon County, Florida June 2005 and December 12, 2005.
- In July 2005, Diebold failed a large volume test in California of the TSx system with VVPAT when a significant percentage of the machines being tested had to be restarted at some point during the testing due either to a jammed printer or to a frozen screen.
- In December 2005, California directed Diebold to send a component of its TSx and optical scan system back to the independent testing authority (ITA) to be re-reviewed. This month advocacy groups have lobbied the EAC to decertify the system on the grounds that the component in question uses 'interpreted' code which they believe is not allowed under the EAC standards.

The Hursti 'hack'. Staff analysis of the 'hack' by Mr. Hursti leaves this office confident the hack would have been detected by election officials and further that the 'hacked' card would never have made it to the polling place when following procedures already in place in Washington. The vulnerability highlighted in Florida is common to polling place equipment regardless of vendor. Essentially, the memory cards must be treated with the same security always given paper ballots.

in this state. If the chain of custody is broken, the memory card can be manipulated by a person with technical skills just as paper ballots can be manipulated by people not properly supervised or observed through well established procedures.

The California Volume Test. After a significant percentage of machines experienced frozen screens or printer jams in a California volume test in July 2005, Diebold determined the cause of the problems, made modifications to the TSx and the printer, recertified the system nationally, and successfully conducted another large scale test in CA observed by our office in September 2005.

ITA review. The understanding of staff is that California is principally asking the ITA to evaluate the component's security vulnerability, if any. The ITA report is expected within a few weeks. Based upon Diebold representations of the component, the expectation of staff is the ITA will find it presents a very limited security vulnerability. This component has been used in this state (and California) without incident for the past decade. The California Secretary of State staff confirmed the Hursti hack used the component in a very limited way and will not succeed when normal correct procedures are followed.

Some concerns have been raised about the ability of a person with visual disabilities to use the VVPAT features of the TSx DRE. The system does not provide a mechanism that allows the VVPAT to be verified by a person with visual disabilities. It does however produce the paper record simultaneously with the audio review of the ballot and allows the voter to verify his/her choices prior to recording the ballot. It is the understanding of staff that this meets the criteria of the Help America Vote Act as interpreted by the Department of Justice when the paper record is used to audit the machine.

A voter who uses an incorrect marking tool to mark the optical scan ballot can create a problem. The equipment will not read a range of red ink. Inspection should be performed on each ballot to insure that black ink, or an ink or pencil that provides high contrast with the ballot color, was used by the voter in marking the ballot.

Additionally, the AccuVote-OS optical scan system only scans the response areas next to the candidate name looking for votes. If a voter marks the ballot in a manner inconsistent with the function of the system (for example, they mark the ballot by circling candidate names), the system will fail to record an otherwise valid vote. A visual inspection of each ballot looking for odd marks and duplicating ballots where necessary will solve this issue.

The test and material review could not establish that the provisional ballot feature on the TSx functions in a manner consistent with RCW and state practice for provisional ballots. The TSx provides a feature of convenience that allows a provisional ballot to be cast and optionally included in the election results after

review by the elections staff. Provisional ballots are part of a “fail safe” process that allows an individual to cast a ballot in situations where poll workers are unable to establish the individual’s eligibility. The ballot is counted only after election staff is able to determine if the individual is eligible to vote on the ballot contests.

After an evaluation of the system as upgraded and a review of the accompanying documentation, staff believes the system and its components continue to meet current Washington State requirements as outlined in WAC 434-335-040. The documentation accompanying the application for certification shows the system with upgrades has been fully reviewed by federally approved independent testing authorities and with the exception of the Election Media Processor has received NASED certification.

Diebold GEMS was certified including the TSx with the VVPAT and used in Ohio in the November 2005 elections. Diebold also submitted documentation that the system has been certified in Arizona.

SECRETARY OF STATE STAFF RECOMMENDATION

Staff recommends the Diebold GEMS with the AccuVote-TSx DRE and AccuVote-OS precinct optical scanner be certified for use in Washington State, Staff recommends the Election Media Processor be administratively certified when it is issued a NASED number.

Staff recommends the following procedures be required in conjunction with Diebold GEMS to assure proper tallying and results:

The system may be used as a central counting system if each ballot is manually inspected before tabulation. The inspection should look for improperly marked ballots, and ballots marked with non-standard marking colors.

The memory cards must be treated with the same accountability and security practices that are employed with unvoted and voted paper ballots. The memory card must be sealed into the Accuvote-TSX and AccuVote-OS prior to conducting the logic and accuracy test and prior to setting the card into election mode.

The telephonic features of the AccuVote-OS and TSx units may be used provided that during the canvassing period, the county uses one of the following procedures:

- Manually verify the election results printed at the polling place match the results received at the central computer.
- Replace the uploaded results by re-uploading the memory cards locally with a direct connection to the central computer. The county will verify that the results are unchanged.

After each time ballots are counted, the county will run a cumulative report. Just prior to any time ballots are counted, a cumulative report will be run and verified that it matches the cumulative report from the previous run.

The user county will not use the systems' provisional voting feature and will continue to provide a paper ballot to voters in situations that call for a provisional ballot.

The design of the TSx and Washington State law allow the user county to employ the TSx as an 'in person absentee' system. 'In person absentee' refers to voters who cast a ballot on the TSx prior to the election date. Conceptually this is the same as a voter picking up and casting an absentee paper ballot at the county elections office prior to an election.

The TSx may be used as an 'in person absentee' system provided the following procedures are used to comply with the requirements of Washington State law:

- The security safeguards applied to the TSx are consistent with those used to protect returned absentee ballots.
- Access to the TSx is controlled. The device must remain in plain view of the office or election workers at all times during working hours and under lock and seal after business hours.
- The TSx voter must sign the same oath as an absentee voter and the user county must maintain a log of all 'in person absentee' voters with the voters' signatures.
- The county must be able to determine that the voter has not yet voted prior to voting on the TSx and must be able to update their records so that any mail ballots returned by the voter will be rejected.
- The poll books must be marked with an indicator that warns the poll worker to issue a provisional ballot to a voter at the polls who has voted previously in person.
- It is also recommended that the user county keep a record of the number of votes cast each evening when they close the TSx and confirm the number of votes on the device when opening the device the next morning. It is further recommended that the Card Activator be kept separate from the TSx after hours.

Counties using this system must conduct regular maintenance of the AccuVote-OS optical scan units, . The counties must also review precinct election results during the canvassing period to detect anomalies. This is required of all systems used in the state.

Prior to every election the user county will test the touch screen device for calibration. This will be done to insure the touch screen responds correctly to the user's touch.

Prior to every election the user county must listen to the entire audio ballot and correct any mispronunciations.

It is recommended that the canvassing board of any county using this system adopt written procedures governing these processes. This equipment should be used with a device or devices capable of suppressing current surges, voltage fluctuations, and any other line disturbances.